

The needs of old people

The 'interval' as a method of measurement

BERNARD ISAACS* AND YVONNE NEVILLE

Department of Geriatric Medicine, Glasgow Royal Infirmary

Isaacs, B. and Neville, Y. (1976). *British Journal of Preventive and Social Medicine*, **30**, 79-85. **The needs of old people: the 'interval' as a method of measurement.** A survey was conducted of 1035 persons constituting a semi-random age-structured sample of the populations of three areas in the west of Scotland. The object was to attempt to estimate the needs of this population for domiciliary services. A method was developed of classifying the subjects into 12 'care groups' based on two characteristics, those of 'potential need' and 'solitude'. 'Potential need' was a measure of disability and its severity was graded according to the intervals that elapsed between necessary periods of help. 'Solitude' was a measure of the time during each day when potential sources of help were spontaneously available. 'Potential need' was found to be related linearly to age but to be independent of the other variables studied. 'Solitude' was commonest in the 75-84-year age group and varied in the three areas studied, but no relationship with any other variable was detected. An estimate was made of the domiciliary services which would be required to ensure a satisfactory standard of care for the subjects in the sample. Assuming present or slightly better levels of hospital provision and slightly lower provision of residential homes there is still a need for a very great increase in domiciliary services if satisfactory standards of community care are to be attained.

In 1970 we were asked by the Research and Intelligence Unit of the Scottish Home and Health Department to attempt to derive a method for the measurement of the needs of old people for residential and domiciliary services. The object was to put into the hands of planners a ready means of evaluating local needs. In this paper is given an outline of the methods and results; full details are in the main report of the study (Isaacs and Neville, 1976).

The method chosen was to conduct a survey of a random sample of the elderly population of three diverse areas in the west of Scotland, based on general practice lists. These subjects were then looked at in two ways:

1. The actual help which the subjects in the sample received was noted and the further help which they might require in order to ensure that they were adequately supported was estimated. The addition of these two gave a measure of their true needs.
2. The subjects were classified into 12 'care-groups' according to their degree of disability and social isolation. For each 'care-group' an appropriate service or 'mix' of services was defined; and the needs of the whole sample were expressed as the sum of the needs of the 'care-groups'.

The estimate of needs made by these two methods was similar. This made it appear possible to define, from the characteristics of any elderly population, its distribution into 'care-groups' and thus to estimate its need of services.

*Present address: Charles Hayward Chair of Geriatric Medicine, University of Birmingham.

THE SURVEY

Three areas in the west of Scotland of different social and economic character were defined. These were:

1. The east end of Glasgow, an industrial and local authority housing area with many old and poor quality tenement houses.
2. The Langside area of Glasgow, a well settled residential area with better quality but mainly old housing.
3. The seaside burgh of Largs, a more prosperous resort and retirement area on the Firth of Clyde.

The names of patients were drawn at random from the lists of National Health Service general practitioners whose practice premises were in the defined areas of the study. All but one of the practitioners approached gave their consent for participation. From each general practitioner, 10 persons were sampled, one of each sex, in each of the five age groups 65-69, 70-74, 75-79, 80-84, and 85 years and over. Altogether 1372 names were drawn, but many of these were of subjects who had died, moved away, or were otherwise untraceable. Eventually a sample was obtained of 1035 subjects of whom 994 were at home, six were in residential homes, and 35 were in hospital. The age and sex distribution of the sample in the three areas and their placement at the time of the study are shown in Table I. The numbers found in residential homes and in hospitals were less than might have been expected. Residents of homes were under-represented probably because there were no homes in any of the areas studied, and people living in these areas presumably entered homes in

other districts and changed their general practitioner; this was confirmed by a sample census of hospitals and residential homes throughout the city of Glasgow and the County of Ayrshire.

METHODS

Interviews were conducted with the subjects at home by three trained interviewers, all experienced in working with old people. They used a structured interview supplemented by a narrative description of the individual circumstances. Data were obtained on age, sex, marital status, living arrangements, family structure, housing, and social class. The presence of disability was recorded and a note was made of all help received in the week preceding the visit. In addition, interviewers were asked to evaluate subjectively the adequacy of care and the presence and severity of strain in relatives and others providing assistance. A note was made of the use of domiciliary services. Subjects with disability were seen by a medical member of the research team who evaluated the disability and discussed the case further with the general practitioner and the consultant geriatrician. Subjects in hospital were seen by a doctor who obtained medical information from the case records, and from the patient, staff, and relatives. The social information recorded was that which described their condition as it was just before admission to hospital.

POTENTIAL NEED

Subjects were said to have 'potential need' when they were unable, as a result of physical or mental disease or disability, to perform for themselves all or some of the basic activities of daily living—namely, the provision of food, warmth, cleanliness, and security. 'Potential need' was distinguished from 'actual' need of services, since many subjects with potential need had this met by a spouse, other relative, or friend. Potential need was a measure of disability and implied unfitness (not mere reluctance or habit) to perform independently services necessary for sustenance and maintenance of the immediate environment. Potential need might arise as a result of many different diseases, but some diseases which caused suffering and created medical need did not necessarily produce 'potential need'.

LONG, SHORT, AND CRITICAL INTERVAL NEED

Potential need was divided into three grades of severity, according to the interval elapsing between necessary periods of help. The least severe grade was 'long interval need' when help was required at intervals of 24 hours or more. This grading was applied to subjects who were able to walk indoors,

TABLE I
CHARACTERISTICS OF THE STUDY SAMPLE

Study Sample				Male	Female	Total
Total				489	546	1035
Age (years)						
65 .. ..	..	..	..	101	101	202
70 .. ..	..	..	..	106	111	217
75 .. ..	..	..	..	101	102	203
80 .. ..	..	..	..	100	109	209
85 and over .. ..	..	..	..	81	123	204
Area						
East end .. ..	..	..	..	301	314	615
Langside .. ..	..	..	..	96	118	214
Largs .. ..	..	..	..	92	114	206
Location						
Home .. ..	..	..	..	475	519	994
Residential home .. ..	..	..	..	2	4	6
Hospital .. ..	..	..	..	12	23	35

use the w.c., boil a kettle, and prepare a light meal, but who could not do domestic work or go out to the shops. They needed relatively unskilled help for an hour or two a day.

Rather more disabled were those subjects who were not capable of providing for themselves a hot meal or drink, but who were able to go to and use the w.c. unassisted. They needed two, three, or more periods of help every day at intervals of three to six hours. They thus had 'short interval need'.

The most severely disabled were those subjects who, as a result of immobility or instability, were unable safely and without help or supervision to rise from bed or chair, walk to the w.c., use it and return. Their toilet needs might arise at any time by day or night, at short or unpredictable intervals. They could safely be left alone only for short periods. If their needs were not met as soon as they occurred a different need was created—for example, if the subject fell or was incontinent the need would then become lifting or cleaning him. This group were therefore described as having 'critical interval need'. Included in this category were incontinent subjects, even if they were ambulant, since their need of help could arise at any time; the severely mentally disturbed who were irresponsible, and who, if left unsupervised, might endanger themselves or others—such as, by tampering with gas taps or walking out on to a busy street; and those who were acutely ill and needed constant nursing attention.

POTENTIAL HELP

Potential help is a measure of social support. It is the reverse of solitude. The assumption is that when someone is present in the home the subject with potential need can receive help. The periods when no one is present in the house—that is, the periods of solitude—are times of potentially unmet need. The 'others' whose presence in the house was taken into account included family, neighbours, and friends who visited regularly. Random unexpected visitors and visits from staff of the domiciliary services were not included in the rating. Subjects were classified into one of four grades, known as 'solitude ratings'. They had 'minimal' solitude when they were never alone, or never for more than two hours a day, and they had 'maximal' solitude when they were alone all night and for more than 10 hours a day. Between these extremes came 'diurnal' solitude, describing subjects who were never alone at night, but were alone for two to 12 hours a day, and 'nocturnal' solitude for those who were alone all night but for less than

10 hours a day. By combining the three potential need ratings with the four solitude ratings, subjects were categorized into 12 care-groups.

MET AND UNMET NEED

'Met need' was said to be present when a subject received help from a relative, neighbour, or friend which adequately fulfilled his requirements and which imposed no undue strain on the helpers. 'Unmet need' was present when a subject either received insufficient care to fulfil his basic requirements for food, warmth, cleanliness, and security at a level at which he would have provided them for himself had he been fit to do so, or when care was provided only at a cost of 'undue strain' to the relatives. The measurement of what constituted 'sufficient care' or 'undue strain' was a subjective one; it was made by the interviewers in the first place, and subsequently checked by group discussion among the research team. In the pilot phase of the study, the interviewers differed in their evaluation, but by the time the main survey began they applied similar standards to the assessments which they made. Because of the nature of this measurement an observer variation study was conducted. In the evaluation of 'potential need' there was close agreement between the interviewers, as shown in Table II. In the assessment of 'insufficient basic care' and 'undue strain' there was some variation; Interviewer A, who had had most experience of social work, detected a higher rate of 'unmet need' than her less experienced colleagues (Table II). Any error introduced into the measurement of need by less experienced interviewers may underestimate rather than overestimate the true need for services.

RESULTS

POTENTIAL NEED

The classification of subjects into their 'potential need' gradings, by age, is presented in Table III. The proportion of subjects with potential need increased steeply with age from 16% of those aged 65-74, to 41% of those aged 75-84, and 64% of those aged 85 years and over. The relationship between potential need and age was highly significant. There was no significant relationship between potential need and sex, marital status, social class, living arrangements, family structure, and area of residence. The relationship between age and potential need was most evident in the more severe degrees of disability. A total of 29 of 419 subjects (7%) in the 65-74-year age group had short or critical interval need, compared with 57 of 412 (14%) in the 75-84-year age group, and 75 of 204

TABLE II
EVALUATION OF 'POTENTIAL NEED', 'BASIC CARE' AND 'STRAIN' IN SUBJECTS AT HOME OR IN RESIDENTIAL HOMES BY THREE DIFFERENT INTERVIEWERS

Evaluation	Interviewer					
	A		B		C	
	No.	%	No.	%	No.	%
'Potential need'						
None	424	66.4	167	67.9	77	68.1
Long interval	108	16.9	44	17.9	19	16.8
Short interval	62	9.7	25	10.2	10	8.8
Critical interval	45	7.0	10	4.1	7	6.2
'Basic care' and 'strain'						
Insufficient care only	6	3.6	1	1.2	0	0.9
Strain only	2		0		0	
Both	15		2		1	
Neither	616	96.4	243	98.8	112	99.1
Total interviewed	639	100.0	246	100.0	113	100.0

TABLE III
DISTRIBUTION OF POTENTIAL NEED BY AGE

Potential Need	Age (years)			Total 65+ %
	65-74 %	75-84 %	85 and over %	
At home				
None	83.8	59.0	36.3	64.5
Long interval	8.1	23.5	19.6	16.5
Short interval	5.5	8.3	20.1	9.5
Critical interval	1.4	5.6	16.7	6.1
In hospital	1.2	3.6	7.4	3.4
All with potential need..	16.2	41.0	63.7	35.5
Critical interval need at home + those in hospital ..	2.6	9.2	24.8	9.5
No. in sample = 100% ..	419	412	204	1035

(37%) of those aged 85 years and over. Thus, within the limits of the study potential need was very largely an age-related phenomenon. This suggests that it may be possible to estimate the numbers of old people with potential need in similar communities from a knowledge of their age-structure alone.

POTENTIAL HELP

The 'potential help' ratings of subjects at home with potential need are presented in Table IV. There was no linear relationship between age and solitude. The proportion of subjects aged 75-84

TABLE IV
POTENTIAL HELP RATINGS (SOLITUDE) OF 332 SUBJECTS AT HOME WITH POTENTIAL NEED

Solitude Rating	65-74 %	75-84 %	85 and over %	Total 65+ %
Minimal	63.5	44.8	55.7	52.1
Diurnal	11.1	12.3	17.4	13.9
Nocturnal	11.1	14.9	8.7	12.0
Maximal	14.3	27.9	18.3	22.0
No. with potential need at home = 100%	63	154	115	332

years who had maximal solitude was 28%, compared with 14% for those aged 65-74 years, and 18% for those aged 85 years and over. The 75-84-year age group also had the highest proportion with nocturnal solitude (15%). Those of 85 years and over had the highest proportion of diurnal solitude (17%). Many in this age group were left alone by day while a resident daughter or other helper was out at work. Minimal solitude was the rating of about two-fifths of those aged 75-84 years, one-half of those aged 85 years and over, and three-fifths of those aged 65-74 years. 'Potential help' ratings, unlike 'potential need', varied between areas. Subjects with nocturnal and maximal solitude combined comprised 33% of those with potential need in the east end, 47% in Langside, and 20% in Largs. 'Potential help' ratings were not significantly related to any of the other variables studied. The differences between areas could not be explained by any single factor, and more study of the causes of local variation is required.

CARE-GROUPS

The data on potential need and potential help were combined to form 12 'care-groups', and the number of subjects in each care-group in each of the three age groups, 65-74, 75-84, and 85 years and over for the two sexes combined, was determined. These are shown in Table V. The largest groups were subjects aged 75 years and over with long interval need and maximal solitude, and those in the same age group with short or critical interval need and minimal solitude.

TABLE V

COMBINED CLASSIFICATION INTO 'CARE-GROUPS' OF 332 SUBJECTS AT HOME WITH POTENTIAL NEED AND 35 SUBJECTS IN HOSPITAL, BY AGE

Potential Need	Solitude Rating	65-74	75-84	85 and over	Total 65+
At home Long interval	minimal	18	30	7	55
	diurnal	3	13	7	23
	nocturnal	4	16	7	27
	maximal	9	38	19	66
Short interval	minimal	16	23	28	67
	diurnal	4	4	11	19
	nocturnal	3	4	1	8
	maximal	0	3	1	4
Critical interval	minimal	6	16	29	51
	diurnal	0	2	2	4
	nocturnal	0	3	2	5
	maximal	0	2	1	3
In hospital	(Rating on admission)				
Critical interval	minimal	1	5	7	13
	diurnal	0	0	1	1
	nocturnal	1	3	2	6
	maximal	3	7	5	15

PRESCRIPTION

In an attempt to find a simple formula for estimating the needs of any population of old people for services, the assumption was made that the needs of the members of each care-group were at least approximately homogeneous. The total needs of a population could be determined by 'prescribing' an appropriate level of service for each care-group. The actual deployment of services thus prescribed could be varied according to individual circumstances, but it was assumed that this estimate would ensure that about the correct total amount of service would be made available.

The principle of 'prescribing' was to relate the service to the need. A long interval need in a subject without potential help required a long interval service, a short interval need required a short interval service, and continuous help had to be given to a subject with critical interval need who had no potential help. If the amount of potential help was sufficient—that is, if the subject had

'minimal' solitude—no service was required. But if the intervals between periods of need were shorter than the intervals between periods of potential help—for example, in a subject with short interval need and diurnal solitude, an appropriate service was prescribed to fill the gap. The 'prescriptions' for each care-group are shown in Table VI.

TABLE VI
CARE-GROUPS AND 'PRESCRIBED' SERVICES: 332 SUBJECTS AT HOME AND 35 IN HOSPITAL

Potential Need	Solitude Rating	No. in Sample	Services
Long interval:	minimal diurnal nocturnal	105	Home care, no services
	maximal	66	Home care with home help
Short interval:	minimal	67	Home care, no services
	diurnal nocturnal	27	Home care with home help and care-giver
Critical interval:	maximal	4	Residential home
	minimal	64	District nurse
	diurnal nocturnal maximal	34	Hospital

The home help and district nurse were classified as normally providing a long interval service, although with appropriate levels of staffing they might give short interval service. Residential homes and hospitals both offer continuous care, although for different types of need. Short interval need requires short interval service to provide several brief periods of help and supervision daily in order to fill the gaps in the care required by disabled people during periods of solitude. Such a service is that provided at present to a limited extent by the wardens of sheltered housing, by 'good neighbours', and 'street wardens'. In the prescription a service of this type is referred to as a 'care-giver' service.

COMPARISON OF PRESCRIBED SERVICES WITH ACTUAL NEED

The 'prescriptions' written for each care-group were compared with the services actually used and the adequacy of resulting care was noted. Of 64 subjects with critical interval need and minimal solitude, a group for whom home care with district nurse assistance was 'prescribed', 13 were in hospital and 23 were cared for at home inadequately or in conditions of great strain. Extra nursing help would not have sufficed to relieve the strain; some

in this care-group required hospitalization to overcome 'unmet need'. This extra requirement was partially offset by the finding that, of the 34 subjects in the study who were in the care-groups for whom hospital was 'prescribed', only 22 were actually in hospital and of the 12 at home, all but four were receiving sufficient care without undue strain.

In the delivery of short interval service to disabled people at home the amount of time devoted by the helper to each subject is a compromise between the time needed and the staff available. The calculations of required staff were based on a notional home help service of two hours a day seven days a week, and of a district nurse service of one daily visit of half-an-hour's duration seven days a week. On these estimates, and with a small allowance for travel between subjects, one full-time equivalent home help could care for three subjects, and one full-time equivalent district nurse for 10 subjects. Duties to be assigned to a 'care-giver' are to visit two or three times a day in order to see that all is well, to perform small services and errands, and to provide hot drinks or snacks. The concept is developed more fully elsewhere (Isaacs and Neville, 1976). In the study 27 subjects came into the categories for which care-giver services were 'prescribed'. Some subjects in this category could be appropriately cared for in sheltered housing. This remains in short supply, and many prefer to remain in their familiar surroundings.

ESTIMATES

The social conditions and demographic features of the three study areas covered a wide range, but the areas were not selected as being representative of Scotland as a whole. Differences were found in 'potential help' (but not in 'potential need') ratings between areas. For these reasons the data cannot be extrapolated from the study areas to Scotland as a whole. It nevertheless seemed worthwhile to attempt to estimate, however roughly, what the figures from the local studies might conceivably mean in terms of national need (Table VII). Estimates based on the findings suggest that in Scotland as a whole some 250 people per 1000 of population aged 65 years and over may have had 'potential need'. Just over half of these had 'long interval' need, while about 70 persons per 1000 may have had 'short-interval' need, and about 60 per 1000 'critical interval' need. The estimated number who had short or critical interval need combined with diurnal, nocturnal, or maximal solitude—that is those who were severely disabled and alone for much or all of the day—was 46 per 1000

TABLE VII
ESTIMATED PROPORTIONS OF OLD PEOPLE IN
SCOTLAND* IN THE 'CARE-GROUPS'

Potential Need/Solitude Rating		No. aged 65 years and over*	
Long interval:	minimal	50	130
	diurnal	16	
	nocturnal	19	
	maximal	45	
Short interval:	minimal	46	70
	diurnal	12	
	nocturnal	9	
	maximal	3	
Critical interval:	minimal	36	58
	diurnal	2	
	nocturnal	7	
	maximal	13	
All with potential need (%)		25.8	

* per 1000 of population

of population, or nearly 5% of all people aged 65 years and over. The estimated number of those who had some degree of potential need combined with maximal solitude, those who were actually or virtually housebound and entirely alone, was 61 per 1000 or 6% of the elderly population.

From these national 'estimates' of numbers in each care-group, the number of full-time equivalent staff in community services required to care for them was calculated, by applying these 'prescriptions'. The results of these calculations are given in Table VIII. They were based on the assumption that the numbers of geriatric, psychiatric, and residential home places to be provided were 15, 10, and 20 respectively per 1000 of population aged 65 years and over. These figures were based on:

1. The Scottish 'norm' for geriatric bed provision of 15 per 1000 population aged 65 years and over. This compares with the norm of 10 per 1000 for England and Wales.

TABLE VIII
EXISTING SERVICES AND ESTIMATE OF NEED

Per 1000 of population aged 65 and over	Existing	Needed
Geriatric beds	12	15
Psychiatric beds	9	10
Residential home places ..	20	20
Home helps*	7	20
District nurses*	0.7	1
'Good neighbour' service ..	0	10

*Full-time equivalents

2. The occupancy of psychiatric beds in Scotland by patients aged 65 years and over using information derived from the North East Scotland Regional Psychiatric Service. The actual figure may be slightly lower than this, but it is well in excess of the recommended figures given in the Circular HS 72/71.
3. The occupancy of residential home places in Scotland, which run at a slightly lower level than the 25 places per 1000 of population aged 65 years and over recommended for the United Kingdom as a whole.

If the provision of geriatric and psychiatric beds is indeed lower than the assumed figures used in the calculation, the number of community services required to achieve the standard set out in this study will be higher.

Using these figures the estimate of necessary services required, expressed as full-time equivalents per 1000 of population aged 65 years and over, would be 20 home helps and one district nurse, as well as 10 'good neighbours'. These estimates represent a threefold increase in the home help service and a 50% increase in the district nurse service, plus the addition of what in many areas

will be a new service. These findings are in line with those of other surveys (Townsend and Wedderburn, 1965; Harris, 1968; Hunt, 1970) and emphasize the need for a massive increase in investment in services if adequate 'community care' is to be made available to disabled old people. The future anticipated increase in the number of old and especially very old people in the population means that the estimated figures will soon require a sharp upward revision.

Requests for reprints: Professor B. Isaacs, MD, FRCP, Charles Hayward Chair of Geriatric Medicine, University of Birmingham.

REFERENCES

- HARRIS, A. I. (1968). *Social Welfare for the Elderly: A Study in Thirteen Local Authority Areas in England, Wales and Scotland*. HMSO, London.
- HUNT, A. (1970). *The Home Help Service in England and Wales*. HMSO, London.
- ISAACS, B. and NEVILLE, Y. (1976). *The Measurement of Need in Old People. Scottish Health Service Studies, no. 34*. Scottish Home and Health Department, Edinburgh.
- TOWNSEND, P. and WEDDERBURN, D. (1965). *The Aged in the Welfare State*. Bell, London.